DMSO-DIAGNOSTIC MEDICAL SONOGRAPHY

DMSO 1110. Introduction to Clinical Practicum
1 Credit (1)
Introduction to working in the medical environment. Includes preparation for clinical internship and observation hours in the ultrasound department. Restricted to: DMS majors.
Learning Outcomes
1. Recognize sonographic anatomy on observed sonographic procedures.
2. Identify and adhere to clinical site practices and policies.
3. Describe aspects of the clinical experience.
4. Demonstrate effective communication skills with patients and healthcare team members.

DMSO 1111. Introduction Sonography/Patient Care
2 Credits (2)
Introduction to the careers in sonography, terminology, medical ethics, scanning planes, applications of ultrasound, professional standards and patient care.
Learning Outcomes
1. Describe essential functions of the sonographer in the health care setting.
2. Distinguish key patient care differences based on patient demographics.
3. Develop and apply professional ethics in line with industry standards.
4. Describe best practices for infection control in the medical setting.

DMSO 1114. Introduction to Clinical Practicum II
1 Credit (1P)
Development of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at the developmental level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continued observation, assistance and performance of patient care and sonographic duties under direct supervision.
Learning Outcomes
1. Demonstrate proficiency in patient care skills.
2. Recognize sonographic anatomy.
3. Assist with basic sonographic procedures in the clinical setting.
4. Describe aspects of the clinical experience.

DMSO 1116. Vascular Technology I
2 Credits (2)
Review of basic ultrasound physics and principles, peripheral vascular anatomy, hemodynamics, Doppler evaluation, peripheral vascular scanning techniques, physiologic testing and the carotid arteries and the peripheral vascular system.
Learning Outcomes
1. Describe peripheral and cerebrovascular anatomy and physiology.
2. Identify normal anatomy and waveforms on sonographic images and correlative imaging procedures.
3. Correlate Doppler waveforms to hemodynamic principles.
4. Differentiate venous and arterial hemodynamic principles.

DMSO 1116L. Vascular Technology I Lab
1 Credit (2P)
Includes protocol development, scanning techniques, recognition of anatomical relationships and the normal ultrasound appearance of the carotid arteries and peripheral vasculature utilizing real-time sonographic equipment including Doppler.
Learning Outcomes
1. Recognize and document peripheral and cerebrovascular anatomy on sonographic examinations.
2. Develop protocols for thorough imaging of peripheral and cerebrovascular sonographic imaging.
3. Describe Doppler waveforms and correlate findings with hemodynamic principles.

DMSO 1131. Pelvic Sonography
2 Credits (2)
Includes the anatomy, sectional anatomy and normal physiology of the pelvic structures; including the uterus, ovaries, prostate, pelvic muscles, lower GI, appendix and vessels as well as scanning techniques, sonographic appearance and Doppler evaluation of the pelvis.
Learning Outcomes
1. Describe the relational anatomy of the pelvic organs.
2. Distinguish the sonographic appearance of male and female pelvic anatomy.
3. Discuss the physiology of pelvic organ systems.
4. Correlate the physiologic cycles of pelvic organs with the appropriate sonographic appearances.

DMSO 1131L. Pelvic Sonography Laboratory
1 Credit (2P)
Includes protocol development, scanning techniques, recognition of anatomical relationships and the normal ultrasound appearance of the pelvic structures including the uterus, ovaries, prostate, lower gastrointestinal system, appendix and pelvic muscles utilizing real-time sonographic equipment including Doppler.
Learning Outcomes
1. Identify normal anatomy of the male and female pelvis on sonographic images.
2. Produce diagnostic sonographic images of pelvic organs.
3. Develop protocols for thorough sonographic evaluation of the pelvic organs.
4. Correlate sonographic findings with the normal physiologic processes of the female pelvic organs.

DMSO 1140. Abdominal Sonography
2 Credits (2)
Includes the anatomy, sectional anatomy and normal physiology of prevertebral vessels, liver, biliary system, pancreas, upper gastrointestinal system, kidneys, adrenals, and spleen as well as scanning techniques, sonographic appearance and Doppler evaluation of the deep abdominal organs.
Learning Outcomes
1. Identify the normal anatomy of the abdominal organs.
2. Describe the physiology of abdominal organs and how it relates to sonographic appearances.
3. Describe the relational anatomy of abdominal organ systems.

DMSO 1140L. Abdominal Sonography Laboratory
1 Credit (3P)
Includes protocol development, scanning techniques, recognition of anatomical relationships and the normal ultrasound appearance of prevertebral vessels, liver, biliary system, pancreas, upper gastrointestinal

system, kidneys and spleen utilizing real-time sonographic equipment including Doppler.

Learning Outcomes

1. Identify the abdominal organs on sonographic images.
2. Produce diagnostic quality sonographic images of the abdominal organs.
3. Correlate sonographic appearances with the normal physiology of abdominal organs.
4. Develop protocols for thorough and efficient imaging of the abdominal organs.

DMSO 1150. Sonographic Principles and Instrumentation I
2 Credits (2)

Includes the fundamental properties and mathematical relationships between variables of wave parameters, acoustic variables, attenuation, pulsed wave operation, transducers, system operation, Doppler, and artifacts utilizing real-time sonographic equipment.

Learning Outcomes

1. Describe the physics principles related to sonographic imaging.
2. Correlate physics principles to technical factor adjustments on sonographic equipment.
3. Solve mathematical equations related to sonographic physics principles.

DMSO 1170. Clinical Practicum I
1 Credit (8-10P)

Development of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at the developmental level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continued observation, assistance and performance of patient care and sonographic duties under direct supervision.

Learning Outcomes

1. Develop professional skills necessary in the clinical environment.
2. Perform basic sonographic procedures with minimal assistance from preceptors.
3. Assist with complex/advanced sonographic procedures under the guidance of preceptors.

DMSO 1180. Clinical Practicum II
4 Credits (4)

Development of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at the beginner level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continue observation, assistance and performance of patient care and sonographic duties under direct supervision.

Prerequisite: DMSO 1170.

Learning Outcomes

1. Demonstrate general and sonographic knowledge to function as a member of the healthcare team.
2. Identify and interpret data from patient charts.
3. Perform a broad range of general sonographic examinations with minimal to moderate assistance.
4. Demonstrate effective oral and written communication skills.

DMSO 1526. 1st Trimester Obstetric Sonography
1 Credit (1)

Includes the embryology, anatomy, sectional anatomy, normal physiology, biometrics, assessment, and sonographic appearance of the 1st trimester fetus, placenta, uterus and adnexa as well as scanning techniques according to recognized protocols.

Learning Outcomes

1. Describe the embryology and normal development of the 1st trimester pregnancy.
2. Recognize the sonographic anatomy of normal 1st trimester pregnancy.
3. Relate the gestational age with sonographic findings to recognize normal development of the 1st trimester pregnancy.

DMSO 1527. 2nd/3rd Trimester Obstetric Sonography
1 Credit (1)

Includes the anatomy, sectional anatomy, normal physiology, biometrics, assessment, and sonographic appearance of the 2nd and 3rd trimester fetus, placenta, uterus, and adnexa as well as scanning techniques according to recognized protocols.

Learning Outcomes

1. Describe the normal anatomy and physiology of the 2nd and 3rd trimester pregnancy.
2. Correlate the sonographic appearance of the pregnancy with the gestational age to identify appropriate growth and development of the fetus.
3. Develop protocols for efficient and thorough scanning of the pregnancy.
4. Describe best practices for imaging the pregnancy in accordance with ALARA principles.

DMSO 1528. High Risk Obstetric Sonography
3 Credits (3)

Includes congenital malformations of the developing fetus, high risk pregnancies, multiple gestation, maternal conditions and invasive procedures. Restricted to: DMS majors.

Learning Outcomes

1. Describe the sonographic signs of fetal anomalies.
2. Identify the risk factors for congenital anomalies to correlate with clinical history.
3. Describe the process for imaging multiple gestations.
4. Identify best practices for safe imaging in the high risk pregnancy.

DMSO 2020. Pediatric Sonography
2 Credits (2)

Ultrasound evaluation relating to the pediatric population. Includes scanning techniques, transducer selection, and scanning protocols relating to normal and pathologic conditions that affect the premature infant, newborn and pediatric population across a variety of body systems.

Learning Outcomes

1. Identify anatomy, relational anatomy, anatomic variants, and sonographic appearances of normal anatomical structures related to the pediatric population.
2. Demonstrate knowledge of the physiology, pathophysiology, sonographic technique, measurements, sonographic appearances, and Doppler patterns, where applicable, in both normal and abnormal pediatric structures.
3. Demonstrate knowledge in scanning technique, protocol and modifications based on sonographic findings.
4. Demonstrate knowledge and application of patient care as it pertains to the pediatric population.

DMSO 2216. Vascular Technology II
2 Credits (2)
Includes the pathology and pathophysiology of the vascular system, scanning techniques, clinical presentation, ultrasound appearance and Doppler evaluation seen with pathological conditions of the carotid arteries, deep and peripheral vascular systems.
Learning Outcomes
1. Describe risk factors for vascular pathology.
2. Correlate Doppler waveforms with hemodynamic principles in the presence of pathology.
3. Describe the sonographic appearance of pathology in peripheral and cerebrovascular systems.
4. Identify modifications to sonographic techniques when pathology is identified.

DMSO 2226. Sonographic Case Studies I
1 Credit (1)
Includes integration of didactic knowledge, clinical presentation, laboratory values, sonographic appearance and related medical imaging of a variety of pathological conditions through a variety of case analysis and presentations.
Learning Outcomes
1. Utilize the Sonographic Reasoning Method to correlate clinical history with imaging findings.
2. Summarize the sonographic findings of case studies and analyze the technical factors utilized.
3. Recall knowledge of pathologies to apply to their evaluation of sonographic images.
4. Devise and defend a diagnostic hypothesis based on the clinical history and sonographic findings.

DMSO 2227. Sonographic Case Studies II
1 Credit (1)
Continuation of Sonographic Case Studies I, integration of didactic knowledge, clinical presentation, laboratory values, sonographic appearance and related medical imaging of a variety of pathological conditions through a variety of case analysis and presentations.
Learning Outcomes
1. Utilize the Sonographic Reasoning Method to correlate clinical history with imaging findings.
2. Summarize the sonographic findings of case studies and analyze the technical factors utilized.
3. Recall knowledge of pathologies to apply to their evaluation of sonographic images.
4. Devise and defend a diagnostic hypothesis based on the clinical history and sonographic findings.

DMSO 2230. Gynecologic Pathology
2 Credits (2)
Includes the pathology and pathophysiology of the female reproductive system, scanning techniques, clinical presentation, ultrasound appearance and Doppler evaluation seen with pathological conditions of the uterus, ovaries, and adnexa.
Learning Outcomes
1. Recall the normal gynecological anatomy to identify variations or the presence of pathology.
2. Describe risk factors, clinical findings, and the sonographic appearance of gynecological pathologies.
3. Identify diagnostic differentials based on the sonographic appearance of gynecological pathologies.

DMSO 2240. Abdominal Pathology I
2 Credits (2)
Includes the pathology and pathophysiology of abdominal structures of the prevertebral vessels, liver, biliary system, pancreas, spleen and gastrointestinal system; scanning techniques, ultrasound appearance, clinical presentation and Doppler evaluation seen with pathological conditions.
Learning Outcomes
1. Recall the normal anatomy and physiology of the abdominal organs to recognize variations on sonographic images.
2. Describe modifications to the sonographic technique based when pathology is identified.
3. Correlate sonographic findings with clinical information to identify diagnostic differentials.

DMSO 2245. Abdominal Pathology II
2 Credits (2)
Includes the pathology and pathophysiology of abdominal structures of the genitourinary system, spleen, retroperitoneum, adrenal glands, abdominal wall and prostate; scanning techniques, ultrasound appearance, clinical presentation and Doppler evaluation seen with pathological conditions.
Learning Outcomes
1. Recall the normal anatomy and physiology of the abdominal organs to recognize variations on sonographic images.
2. Describe modifications to the sonographic technique when pathology is identified.
3. Correlate sonographic findings with clinical information to identify diagnostic differentials.

DMSO 2250. Sonographic Principles and Instrumentation II
3 Credits (3)
Includes properties of sound and its use in diagnostic imaging, artifacts, system operation, Doppler, basic hemodynamics, image optimization, bio effects, quality assurance, and new technologies in ultrasound imaging.
Learning Outcomes
1. Explain the physics principles associated with sonographic imaging.
2. Describe how physics principles modify the sonographic image.
3. Relate ultrasound physics to bio effects and best practices for safe sonographic imaging.

DMSO 2270. Clinical Practicum III
3 Credits (3P)
Continued development of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at an intermediate level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continued observation, assistance and performance of patient care and sonographic duties under limited supervision.
Learning Outcomes
1. Consistently demonstrate professional skills and etiquette in the clinical setting.
2. Perform basic and advanced sonographic procedures with minimal assistance from preceptors.
3. Perform complex sonographic procedures with guidance from preceptors.
4. Analyze clinical experiences to broaden patient care skills.

DMSO 2280. Clinical Practicum IV
5 Credits (20P)
Application of technical and professional aspects of diagnostic ultrasound in a hospital or clinical setting at a proficient level. Ongoing reinforcement and broadening of knowledge base related to hospital procedures and policies. Continued observation, assistance and performance of patient care and sonographic duties under limited supervision.

Learning Outcomes

1. Demonstrate professional communication with patients and healthcare team members.
2. Perform basic and advanced sonographic procedures with minimal assistance from preceptors.
3. Perform complex sonographic procedures with guidance from preceptors.
4. Analyze clinical experiences to broaden patient care skills.

DMSO 2291. Registry Preparation: OB/GYN
1 Credit (1)
Registry preparation mock examinations over materials covered in Obstetric and Gynecological ultrasound. Students must pass this course with a 74% or better OR pass national certification in OB/GYN Sonography.

Learning Outcomes

1. Recall knowledge of normal anatomy, physiology, and pathology of obstetric and gynecological structures.
2. Evaluate sonographic images and patient history to identify likely pathologies.
3. Self-reflect on tested concepts to identify concepts that require further studying.

DMSO 2292. Registry Preparation: Abdomen
1 Credit (1)
Registry preparation mock examinations over materials covered in abdominal ultrasound including small parts and superficial structures. Students must pass this course with a 74% or better OR pass ARDMS national certification exam in Abdominal Sonography.

Learning Outcomes

1. Recall knowledge of normal anatomy, physiology, and pathology of abdominal and superficial structures.
2. Evaluate sonographic images and patient history to identify likely pathologies.
3. Self-reflect on tested concepts to identify concepts that require further studying.

DMSO 2293. Registry Preparation: Vascular
1 Credit (1)
Registry preparation mock examinations over materials covered in vascular ultrasound. Students must pass this course with a 74% or better OR pass national certification in Vascular Technology.

Learning Outcomes

1. Identify and describe vascular anatomy.
2. Recognize vascular pathology based on sonographic images.
3. Describe hemodynamic changes associated with vascular pathology.
4. Demonstrate understanding of patient care, exam protocols, and department procedures.

DMSO 2295. Small Parts and Superficial Structures
2 Credits (2)
Includes anatomy, pathology and pathophysiology, protocol development, scanning techniques, recognition of anatomical structures and the normal and pathological ultrasound appearance of the breast, thyroid, neck, scrotum, non-cardiac chest and musculoskeletal ultrasound.

Learning Outcomes

1. Describe the anatomy and physiology of small parts and superficial structures.
2. Identify normal anatomy, anatomical variants, and pathology on sonographic images of superficial structures.
3. Correlate sonographic appearances of pathologies with clinical history to develop diagnostic differentials of superficial structures.